

STUDIES IN THE HELIANTHEAE (ASTERACEAE). XXI.

ADDITIONS TO ALLOISPERMUM, GALINSOGA, AND

TRIDAX.

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A number of new species have been encountered in recent years which belong to various genera in the subtribe Galinsoginae of the Heliantheae. In each of the cases, the traditional generic limits have been a problem, and some tentative solutions are offered. The three genera in which the new species are placed, are as follows.

Alloispermum

During the initial listing of the species when the genus was resurrected from the synonymy of Calea (Robinson, 1978a), the concepts of the South American species were particularly inadequate. The area seemed to be dominated by a highly variable A. caracasenum with two minor segregates. A single specimen collected by Lehmann in Ecuador and some laxly cymose material collected by Cuatrecasas in Colombia were regarded as only extremes of A. caracasenum, while A. pachense was kept separate. Since that time, one species, A. steyermarkii, with extremely long-pointed involucral bracts, has been described from Venezuela (Robinson, 1978b), two specimens have been seen from a widely disjunct area in southern Peru, the Cuatrecasas collection has been recognized as a first Colombian record of the otherwise Ecuadorian A. sodiroi, and the Lehmann collection from Ecuador has been re-examined and found to be distinct. The concepts of A. lindenii (Sch.Bip. ex Wedd.) H.Robins. and A. steyermarkii H.Robins. remain unchanged, but the studies have indicated the need for the following two new species, new combination and new synonymy.

Alloispermum caracasenum (H.B.K.) H.Robins. is re-interpreted to include C. pachensis Hieron. The latter was originally described for material that lacked ray flowers. Such discoid forms have sometimes been treated as Calea caracasana forma discoidea B.L.Robins. These occur sporadically throughout the range of the species, and they seem best treated at the level of a forma.

There are more significant variations in A. caracasenum. The typical element has five rays in the head and glabrous outer

surfaces of the involucre bracts. Specimens with 8 rays in the heads and pubescent outer surfaces of the involucre bracts are rather common in Colombia, but the two characters are not always correlated.

Alloispermum lehmannii H. Robinson, sp. nov.

Plantae subscandentes? mediocriter ramosae. Caules brunnescentes teretes sparse hirsuti, pilis sub nodis densioribus. Folia opposita, petiolis plerumque 1-2 mm longis; laminae lanceolatae ad 5-6 cm longae et 1.0-1.7 cm latae base anguste rotundatae vel breviter obtusae margine subintegrae apice argute acuminatae supra dense scabridulae subtus subdense pilosae fere ad basem trinervatae, nervis secundariis ad marginem subparallelis. Inflorescentiae laxae corymbosae, ramis 3.5-5.5 cm longis pilosis, pilis erecto-patentibus superioribus densioribus. Capitula ca. 7 mm alta sine radiis ca. 8 mm lata; squamae involucri ca. 20 ca. 3-seriatae subcoriaceae marginaliter rubro-tinctae ovatae vel late oblongae plerumque 3-4 mm longae et 2.0-2.5 mm latae apice rotundatae subscariosae extus glabrae; paleae scariosae suboblongae ca. 3 mm longae apice obtusae. Flores radii ca. 7; corollae albae? ca. 8 mm longae, tubis ca. 2 mm longis dense hispidulis, limbis oblongis ca. 6 mm longis et 4 mm latis apice valde trilobatae extus inferne pilosulis. Achaenia radii ca. 2 mm longa glabra; pappus nullus. Flores disci 25-30; corollae flavae 3.5-4.0 mm longae extus plerumque dense pilosulae, tubis ca. 1.2 mm longis, faucis abrupte campanulatis ca. 1.7 mm longis superne sparse pilosulis, lobis 0.6-0.7 mm longis et latis; thecae antherarum ca. 1.2 mm longae, cellulis endothecialibus in parietibus transversalibus 3-4-noduliferis; appendices antherarum non glanduliferae. Achaenia disci ca. 2.5 mm longa sparse setifera; squamae pappi ca. 15 subulatae plerumque 3.0-4.8 mm longae. Grana pollinis 30-32 μ m in diam.

TYPE: ECUADOR: Tungurahua: Am Tungurahua-Volcan. 2000 m, 30.10.1879. Lehmann 330 (Holotype US). The specimen was determined as Calea integrifolia Hemsl. by Klatt.

Alloispermum lehmannii is most notably distinct by the small disk corollas and short paleae. The single specimen also shows a more flexuous habit and more elongate branches of the inflorescence than is characteristic of the related A. caracasana. The type locality on the Volcan Tungurahua seems distinctly isolated from the ranges of A. caracasana and A. sodiroi to the north.

Alloispermum sodiroi (Hieron.) H. Robinson, comb. nov. Calea sodiroi Hieron., Bot. Jahrb. 29: 51. 1900. Sabazia sodiroi (Hieron.) Turner, Wrightia 5 (8): 305. 1976. The species is most obviously distinct from A. caracasana by the strongly cymose lax inflorescence with the obviously older terminal heads being greatly over-topped by the lateral branches. Dr. Cuatrecasas also informs me that his recent collection of an 8-rayed form from Cundinamarca, Colombia (Cuatrecasas & Jaramillo 28792), is

a more herbaceous subscandent plant. In contrast, A. caracasenum is definitely a shrub. The paleae of the latter are also less toothed or lobed.

The transfer of the species from Calea to Sabazia by Turner (1976) raises the question of why this species was singled out from among its relatives such as A. caracasenum, but it also points up the serious problem of generic distinction between Sabazia and Alloispermum. A brief review of the species has not shown me any simple answer with an obvious point of separation, but it has left me with the impression of a rather uniform Alloispermum having larger plants, distinctly branching inflorescences, ray achenes always lacking a pappus while a pappus is normally present on the disk achenes, and endothelial cells with multiple thickenings. Sabazia, as represented by its type, S. humilis (H.B.K.) Cass. (Longpre, 1970), is a smaller herbaceous plant with a strong tendency toward solitary long-pedunculate heads, it has a pappus that is short or lacking, and has mostly single thickenings on the transverse walls of the endothelial cells. Problems arise in such species as Sabazia palmeri (A.Gray) Urbatsch & Turner of Mexico, which has the habit of Alloispermum, but has a distinct pappus on the ray achenes, and in S. trianae (Hieron.) Longpre of Colombia and S. densa Longpre of Costa Rica which have the habit of Sabazia but have the pappus and some other features of Alloispermum. It is not certain that the habit differences represent a single phyletic trend. The pollen sizes show a tendency to be larger in Alloispermum, but they are also larger in the southern species of Sabazia. The species of Sabazia from Mexico that have been examined, including S. palmeri, have small dense papillae on the inner surfaces of the disk corolla lobes. Alloispermum has consistently larger papillae on the lobes and has a uniform pubescence to the outer surfaces of the lobes. Sabazia densa and S. trianae also have larger papillae, though not exactly as in Alloispermum. Sabazia acoma (Blake) Longpre of Colombia has larger papillae, but differs by the lack of hairs on the outer surfaces of the disk corolla lobes.

I am not prepared to see such extremes as Alloispermum and typical Sabazia placed in the same genus. For the present, I have left in Sabazia all those species that lack the precise characters of Alloispermum, having either solitary long-pedunculate heads or a different form of pappus. For others who might favor a broader genus concept, it should be noted that the name Alloispermum has priority over Sabazia.

Alloispermum weberbaueri H. Robinson, sp. nov.

Plantae subscandentes suffruticosae ad 2 m altae mediocriter ramosae. Caules brunnescentes teretes leniter striati sparse hirsuti, pilis superioribus densioribus. Folia opposita, petiolis 3-8 mm longis; laminae lanceolatae 5.0-7.5 cm longae et 1-2 cm latae base obtuse vel acute cuneatae margine integrae vel remote serratae apice anguste acuminatae supra tenuiter pilosae subtus

tenuiter pilosae et in nervis dense hirsutae fere ad basem trinervatae, nervis secundariis maxime ascendentibus. Inflorescentiae laxae corymbosae, ramis ultimis plerumque 2-5 cm longis sensim dense pilosulis et interdum stipitato-glanduliferis. Capitula ca. 10 mm alta et sine radiis 8-10 mm lata; squamae involucri ca. 15 ca. 3-seriatae subcoriaceae flavescentes ovatae vel oblongae 3-7 mm longae et 2-3 mm latae apice subcutae subscariosae extus glabrae; paleae scariosae lanceolatae 6-7 mm longae inferne 1.5-2.0 mm latae apice anguste acutae margine in part erosae vel dentatae. Flores radii plerumque 10-12; corollae albae 7-12 mm longae, tubis 2.5-3.0 mm longis dense hispidulis, limbis oblongis 5-9 mm longis et 3-4 mm latis apice distincte trilobatae extus inferne pilosulis. Achaenia radii 2.0-2.3 mm longa glabra; pappus nullus vel raro unisquamellosus. Flores disci ca. 30-45; corollae viridi-flavae ca. 6 mm longae extus plerumque dense pilosulae, tubis 1.7-2.0 mm longis, faucis 3.0-3.5 mm longis superne sparse pilosulis, lobis 0.7-0.9 mm longis et 0.6-0.7 mm latis; thecae antherarum ca. 1.8 mm longae, cellulis endothecialibus in parietibus transversalibus 3-4-noduliferis; appendices antherarum non glanduliferae. Achaenia disci ca. 2.3 mm longa plerumque sparse setifera; squamae pappi plerumque ca. 20 subulatae plerumque ca. 4.5 mm longae raro nullae. Grana pollinis ca. 30-32 μ m in diam.

TYPE: PERU: Ayacucho: Prov. Huanta: Choimacota Valley. Alt. 2900-3000 m. Evergreen bush-wood. Climbing shrub. Ray-fls. white, disk-fls. yellow. Feb. 28-Mar. 10, 1926. A. Weberbauer 7581 (Holotype US). PARATYPE: PERU: Ayacucho: Ccarrapa, between Huanta and Río Apurímac; alt. 1200 meters; open hillside. Herb, to 7 ft, with divaricate branches; rays white; florets greenish yellow. May 5, 6, 1929. Killip & A.C. Smith 22422 (US).

Alloispermum weberbaueri is distinct among the South American species by the numerous rays in the heads. The rather lax inflorescence and the more scandent habit further distinguish the species from A. caracasana. The paratype specimen is from the same region as the holotype and is obviously the same species, but it has no pappus on either the ray or disk achenes. The latter condition evidently represents that calvoused-achened condition that occurs sporadically in the Asteraceae and which is characteristic of the ray achenes of all species presently placed in Alloispermum.

The species range in southern Peru is widely disjunct from other members of the genus. The nearest approach is A. lehmannii of central Ecuador.

Galinsoga

The genus has been revised recently by Canne (1977), and has been broadened to include such elements as Sabazia trifida Fay and Tricarpha durangensis Longpre. The genus is further extended here to include the following related new species from Venezuela.

Galinsoga macrocephala H. Robinson, sp. nov.

Plantae herbaceae annuae? mediocriter ramosae ca. 30 cm altae. Caules purpurascens teretes leniter striati sparse albo-hirsuti. Folia opposita, petiolis 2-5 mm longis; laminae ovatae plerumque 12-20 mm longae et 3-13 mm latae base obtuse cuneatae et per breviter acuminatae margine multo serrulatae apice acutae vel breviter acuminatae supra in sicco atro-virides subtus pallidiores utrinque dense pilosae fere ad basem ascendentiter trinervatae. Inflorescentiae diffusae laxae plerumque alterne ramosae pauci-capitatae, ramis 9-27 mm longis hirtellis et stipitato-glanduliferis. Capitula late campanulata ca. 8 mm alta et 7-8 mm lata; squamae involucri ca. 25 flavo-virides subimbricatae membranaceae late oblongae 3-6 mm longae et 2.0-2.5 mm latae apice obtusae vel acutae margine anguste scariosae minute setuliferae extus glabrae 4-6-pallidomaculatae; receptacula conica; paleae interiores minores scariosae facile deciduae. Flores radii ca. 14; corollae rubro-purpurascens ca. 6 mm longae, tubis 4.5 mm longis dense breviter hispidulis, limbis minute subquadratis ca. 1.5 mm longis et 1 mm latis apice distincte trilobatis. Flores disci ca. 25; corollae flavae 3.5-4.0 mm longae, tubis angustis 2.0-2.5 mm longis dense breviter hispidulis, faucis late infundibularibus ca. 1 mm longis inferne sparse hispidulis, lobis ca. 0.4 mm longis et 0.3 mm latis extus superne pauca breviter puberulis; thecae antherarum ca. 0.5 mm longae; appendices antherarum anguste ovatae glabrae. Achaenia obovata ca. 2.7 mm longa et 0.7 mm lata glabra; setae pappi numerosae fusiformes perfacile deciduae plerumque 1.0-1.5 mm longae. Grana pollinis 27-30 μ m in diam.

TYPE: VENEZUELA: Merida: El Delgadito ad El Portochuelo, 2700 m. 18 XI 1976. A. Charpin, F. Jacquemoud & L. Ruiz-teran 13531 (Holotype US).

The new species has the general habit of *Galinsoga*, and it keys to that genus in the partial key to the genera of the Galinsoginae by Canne (1978). Also, the short ray flowers are very reminiscent of the ray of *G. quadriradiata* R. & P., and the anthers are small as in other members of the genus (Powell, 1965). The readily deciduous setiform pappus of the new species differs from the forms traditionally included in the genus, but a similar form is found in one Mexican species, *G. formosa* Canne (= *Sabazia trifida* Fay), included in the genus by Canne (1977). The new species remains unique in the genus by the comparatively large size of the heads. The peripheral paleae do not form complexes with the inner involucre bracts as in typical *Galinsoga*.

The extremely deciduous nature of the pappus setae makes an exact count impossible. A guess would be about 10 per achene, and they are present on both the ray and disk achenes.

Tridax

After careful consideration, the following new species is placed in the genus *Tridax*.

Tridax moorei H. Robinson sp. nov.

Plantae herbaceae vel inferne lignosae perennes multo ramosae ad 12 cm altae. Caules pallide rubrescentes teretes albo-strigosi. Folia opposita, petiolis ca. 1 mm longis; laminae lineares 6-9 mm longae et ca. 1 mm latae base anguste cuneatae margine integrae apice anguste obtusae supra lucidae sparse strigoso-pilosae subtus anguste subcarnosae plerumque in nervis primariis et marginis strigoso-pilosae, nervis secundariis indistinctis subnullis. Inflorescentiae diffusae in ramis terminales unicapitatae, pedunculis plerumque 1-3 cm longis strigoso-pilosis. Capitula campanulata 7-8 mm alta et 5-6 mm lata; squamae involucri ca. 20 tri-seriatae subimbricatae membranaceae flavescentes vel in parte rubro-tinctae lanceolatae 2.5-5.5 mm longae plerumque 1.0-1.5 mm latae apice acutae margine subscariosae et laxe fimbriatae extus leniter striati et sparse pilosae; receptacula alte conica; paleae lineares ca. 5 mm longae. Flores radii ca. 8; corollae albae, tubis ca. 2.5 mm longis minute pilosulis, limbis oblongis ca. 5 mm longis et 2 mm latis apice distincte trilobatis. Flores disci ca. 30; corollae albae? ca. 4.5 mm longae, tubis ca. 1 mm longis dense scabridulis, faucis cylindraceis vel anguste infundibularibus ca. 2.5 mm longis extus glabris, lobis triangularibus ca. 0.6 mm longis et 0.45 mm latis extus minute puberulis; thecae antherarum ca. 1.5 mm longae, cellulis endothelialibus in parietibus transversalibus uni-noduliferis; appendices antherarum non glanduliferae; ramis stylorum 1.0-1.3 mm longis. Achaenia ca. 2 mm longa dense setifera; setae pappi in achaeniis radii paucae breves plerumque 0.5 mm longae; setae pappi in achaeniis disci ca. 16 anguste subulatae plerumque 3.5-4.5 mm longae barbellatae vel subplumosae inferne aliquantum alatae. Grana pollinis ca. 30 μ m in diam.

TYPE: MEXICO: Hidalgo: Dist. Actopan: Slopes and summit of Cerro de las Canteras, near Puerto de San Pedro, Km. 104 on highway from Pachuca to Actopan, alt. 2500-2700 m. In crevices of cliffs on east face of summit. Flowers white. 12 October 1946. H.E. Moore, Jr. 1487 (Holotype BH).

The Moore specimen has been held for a number of years as an undescribed member of the Galinsoginae because precise generic position was not clear. The barbellate to subplumose pappus setae and the more or less solitary heads might indicate Tridax, but the lack of inner lobes on the ray corollas and the lack of a gland on the anther appendage are unusual for that genus. In the partial key to the genera of the Galinsoginae by Canne (1978) the species falls into Sabazia, but the species does not fit into the concept of the latter genus derived from the present study of the Alloispermum-Sabazia relationship. A position in Tridax ultimately seems best, with the realization that a new genus may eventually need to be established for the species.

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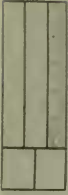
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Alloispermum lehmannii H. Robinson, Holotype, United States National Herbarium. Photos by Victor E. Krantz, Staff Photographer, National Museum of Natural History.



Alloispermum weberbaueri H. Robinson, Holotype, United States National Herbarium.



Tridax moorei H. Robinson Holotype

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Tridax moorei H. Robinson, Holotype, Bailey Hortorium, Cornell University.